ONKYO SERVICE MANUAL

SERVO LOCKED FM/AM STEREO RECEIVER MODEL TX-3000





D model

G/W model

SPECIFICATIONS

AMPLIFIER SECTION

Output Power: 45 watts per channel, min. RMS,

at 8 ohms both channels driven, from 20 Hz to 20,000 Hz, with

no more than 0.04% total

harmonic distortion.

Total Harmonic

Distortion:

0.04% at rated power 0.04% at 1 watt output

IM Distortion:

0.1% at rated power 0.04% at 1 watt output

 $20 \text{ Hz} - 30,000 \text{ Hz} (\pm 1 \text{ dB})$

 $20 \text{ Hz} - 20,000 \text{ Hz} (\pm 0.8 \text{ dB})$

Tape Play: 150 mV, 50 kohms

Tape Rec: 150 mV, 3.5 kohms

180 mV r.m.s. at 1 kHz, 0.04%

Phono: 85 dB (at 10 mV input

IHF A weighted)

0.8 mV at Volume Control: min.

65 dB (IHF C weighted)

95 dB (IHF A weighted)

90 dB (IHF C weighted)

±12 dB at 100 Hz

±12 dB at 10 kHz

(PH)

2.5 mV, 50 kohms

40 at 8 ohms

Phono:

T.H.D.

Tape:

Bass:

Treble:

Damping Factor:

Frequency Response:

RIAA Deviation:

Sensitivity & Impedance:

Phono Overload:

Signal-to-Noise Ratio:

Residual Hum & Noise: Tone Controls:

High Filter:

Loudness (-30 dB):

6 kHz (6 dB/oct) +9 dB at 40 Hz +5 dB at 20 kHz

TUNER SECTION

FM:

Tuning Range:

88 – 108 MHz (D model) 87.5 MHz - 108 MHz

(G/W model)

Usable Sensitivity:

Mono:

Mono:

 $60 \, \mathrm{dB}$

11.2 dBf, $2 \mu V$ 19.2 dBf, $5 \mu V$ Stereo:

 $17.2 \text{ dBf}, 4 \mu\text{V}$

 $37.2 \text{ dBf}, 40 \mu\text{V}$

50 dB Quieting

Sensitivity:

Stereo: Capture Ratio: 1.5 dB

Image Rejection Ratio:

IF Rejection Ratio:

85 dB

Spurious Rejection Ratio: 85 dB

Signal-to-Noise Ratio:

Mono: Stereo: 70 dB65 dB

Alternate Channel Att:

AM Suppression Ratio: Harmonic Distortion:

60 dB 52 dB

Mono:

0.15% Stereo: 0.3%

Frequency Response: Stereo Separation:

 $30 \text{ Hz} - 15,000 \text{ Hz} (\pm 1.5 \text{ dB})$

40 dB at 1 kHz 30 dB at 100 Hz - 10.000 Hz

Muting Level:

Stereo Threshold:

Servo Lock Level:

14.7 dBf, $3 \mu V$ 14.7 dBf. 3 uV

14.7 dBf, 3 μV

AM:

Tuning Range: $525 - 1,620 \, \text{kHz}$

Usable Sensitivity: 25 μV Image Rejection Ratio: 45 dB IF Rejection Ratio: 30 dBSignal-to-Noise Ratio: 40 dB Harmonic Distortion: 0.8%

GENERAL

Power Supply:

AC 120 volts, 60 Hz (D model) AC 220 volts, 50 Hz (G model) AC 220/120 volts, 50/60 Hz

(W model)

Outputs: Speaker A & B, Phones, Tape

Rec Out 1 & 2, AC Outlet (x 2) (D model) Phono, Tape Play 1 & 2

Inputs:

FM and AM Antennas FM: 300 ohms balanced and

Antennas:

75 ohms unbalanced AM: built-in ferrite core

antenna and external

terminal

Semiconductors:

1 FET, 20 transistors, 11 ICs, 38 diodes (D & W model)

1 FET, 22 transistors, 11 ICs, 38 diodes (G model)

Dimensions (W x H x D): $480 \times 130 \times 376 \text{ mm}$

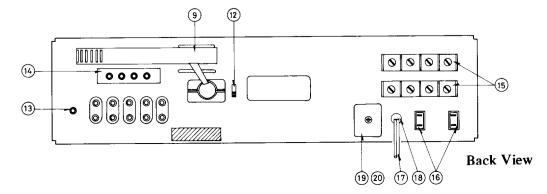
19" x 5-1/8" x 14-13/16"

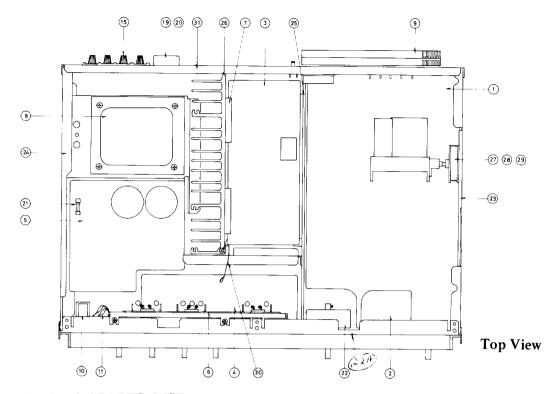
Weight:

11.4 kg, 25.1 lbs

Specifications and features are subject to change without notice.

COMPONENT LOCATION

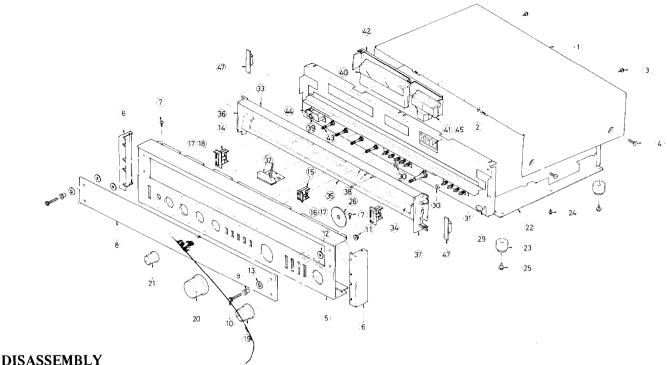




COMPONENT LOCATION-PARTS LIST

COM	IPONENI	LUCATIO	N-PAKIS LISI				
D /W	model			31		27120200	Back panel (D)
D/W	modei					27120202	Back panel (W)
REF.	CIDCILIT NO	DADTE NO	DECCRIPTION			252025	2.5A-T, AC fuse(W)
NO.	CIRCUIT NO.	PARIS NO.	DESCRIPTION			250143	FF-1S4, Fuseholder(W)
1		13549581A	NARFE-781a, FM/AM tuner				(on the chassis)
•		150.500111	and equalizer amplifier p.c.b.			27300288	Switch locked plate(W)
2		13549583	NASW-783, Switch p.c.b.			25065109	NSS-2255P, Voltage selector
$\tilde{3}$		13549584	NADA-784, Power amplifier				switch(W) (on the back panel)
			p.c.b.	Gm	odel		
4		13549586	NAAF-786, Tone amplifier				
			p.c.b. (D)	REF.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
		13550586B	NAAF-786b, Tone amplifier	NO.			
			p.c.b. (W)	1		13552581	NARFE-781, FM/AM tuner and
5		13549585	NAPS-785, Power supply circuit	_			equalizer amplifier p.c.b.
			p.c.b.	2		13549583	NASW-783, Switch p.c.b.
6		13549587	NAPL-787, Meter illumination	3		13549584	NADA-784, Power amplifier
			lamp p.c.b.				p.c.b.
7	Q503, Q603	222022	STK-0050II, Power amplifier IC	4		13552586A	NAAF-786a, Tone amplifier
8	T901	250350	NPT-696D, Power transformer (D)	5		125525054	p.c.b.
	1150	250361	NPT-696DG, Power transformer (W)	3		13332383A	NAPS-785a, Power supply
9	L152	232066	NMA-3012, AM bar antenna	6		13549587	circuit p.c.b.
10	C951	3500054	0.01 µF, 125V, CS capacitor(D)	U		13343367	NAPL-787, Meter illumination
	C951, C952	3500058	PME265MB510, IS capacitor	7	Q503, Q603	222022	lamp p.c.b. STK-0050II, Power amplifier IC
11	R528, R628	441623314	(W) 330Ω, 1W, Metal oxide film	8	T901	250351	NPT-696G, Power transformer
11	K326, K026	441023314	resistor	9	L152	232066	NMA-3012, AM bar antenna
12	S706	25065016	NSS-2327, Slide switch	10	C951	3500058	PME265MB510, IS capacitor
13	P804	25060008	Ground terminal	11		441623314	330Ω, 1W, Metal oxide film
14	P805	25060035	NTM-4PRMC06, Antenna		,		resistor
	1005	23000033	terminal	12	S706	25065016	NSS-2327, Slide switch
15	P806, P807	25060038	NTM-4PRMN09, Speaker	13	P804	25060008	Ground terminal
	,		terminal	14	P805	25060035	NTM-4PRMC06, Antenna
16	P901, P902	25050032	S-I6444-01, AC outlet		_		terminal
17	W901	253099A	AS-UC-3, Power supply cord(D)	15	P806, P807	25060038	NTM-4PRMN09, Speaker
		253083	AS-CEE, Power supply cord(W)		****		terminal
18	W901a	270025	SR-3P-4, Strainrelief (D)	17	W901	253083	AS-CEE, Power supply cord
		270280	SR-4K-4, Strainrelief (W)	18	W901a	270280	SR-4K-4, Strainrelief
19	F501, F601	252014	4A-T, Speaker protection fuse	19	F501, F601	252014	4A-T, Speaker protection fuse
20	E001	25050004	Fuseholder	20 21	F901	25050004	Fuseholder
21	F901	252049	4A(ST-6), AC fuse(D) (on the	21	F902, F903	252074 252078	2A-SE-EAK, AC fuse
		252014	power supply p.c.b.) 4A-T, AC fuse(W) (on the		1902, 1903	232076	5A-SE-EAK (on the power
		232014	power supply p.c.b.)	22		27205021	supply p.c.b.) Drive shaft
22		27205021	Drive shaft	23		27115058	Side bracket (R)
23		27115058	Side bracket (R)	24		27115050	Side bracket (L)
24		27115059	Side bracket (L)	25		27115060	Center bracket
25		27115060	Center bracket	26		27160062A	
26		27160062A		27		270760A	Dial drum
27		270760A	Dial drum	28		273803A	SP-14A, Spring
28		273803A	SP-14A, Spring	29		273903	Stringing
29		273903	Stringing	30		273812	Spring for pointer lamp
30		273812	Spring for pointer lamp	31		27120201	Back panel (D)
							- ` '

EXPLODED VIEW



Top Cover

Remove the four screws (4) holding the top cover and side

Remove the two screws (3) holding the top cover and back panel.

Front Panel

Remove the top cover.

Remove the TUNING knob.

Remove the five screws holding the front panel and front bracket.

Bottom board

Remove the four screws (24) holding the bottom board and chassis.

Remove the four screws (25) holding the bottom board and legs.

Meters

Remove the top panel.

Remove the two screws holding the lamp bracket and front baracket.

Dial Glass

Remove the four screws holding the dial glass and front panel.

Notes: The dial glass has been mounted by applying an 800 gr torque to the screws.

If the dial glass is removed during repairs, and a torque driver is available, apply 800 gr torque to the screws when replacing. If however, a torque driver is not available, simply tighten the screws by hand. When replacing the dial glass, insert all relevant component parts (9-13) in accordance with the exploded view.

Pointer Lamp

Remove the top cover and front panel.

SERVICE PROCEDURES

Sensor Switch (SENSOR)

This switch enables the servo lock system for automatic FM tuning to be matched with the various operating conditions. Set it at LOW initially. Switch to NORM or HIGH if the TUNED lamp does not instantly turn off when you touch the tuning knob.

Power Meter/Signal Strength Meter

When the tuning is not being operated, this meter displays the level of power applied to the right speaker system. The instant the tuning knob is touched, the meter changes to display the signal strength of the radio broadcast being received at that moment. Tune a station so the needle moves as far to the right as possible.

De-emphasis switch (Only W model)

The 25 μ sec/Normal selector switch for Dolby FM boadcasts is located on the front panel. The 50 μ sec/75 μ sec selector switch employed in the W (120/220V) model is located on the bottom board. When shipped from the factory, this switch is set to the 50 μ sec position. For use in 75 μ sec regions, switch over to the 75 μ sec position.

Voltage conversion (Only W model)

This set may be set to operated at either 120V or 220V at 50Hz to 60Hz. This voltage selector switch is located on the back panel. If a voltage change, is necessary, remove the lock plate, switch to the proper voltage, and replace the plate.

EXPLODED VIEW - PARTS LIST

D model			G/W mo	del	
REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1	28184071	Top cover	1	28184072	Top cover
2	28140020	4tx10x40, Cushion	2	28140020	4tx10x40, Cushion
3	834430062	3STS+6BQ(BC), Tapping screw	3	834430062	3STS+6BQ(BC), Tapping screw
4	838440083	4STB+8CQ(BC), Tapping screw	4	838440083	4STB+8CQ(BC), Tapping screw
5	13549121	Front panel ass'y (5, 6, 14, 15)	5	13549121	Front panel ass'y (5, 6, 14, 15)
6	28125076	End cap	6	28125076	End cap
7	834130062	3STS+6BQ, Tapping screw	7	834130062	3STS+6BQ, Tapping screw
8	28191050	Dial glass	8	28191050	Dial glass
9.	~27270014	Spacer	9	27270014	Spacer
10	27300038A	Special screw	10	27300038B	Special screw
11	86213010	ŴN3x10FN, Nut	11	86213010	WN3x10FN, Nut
12	870051	10x3.5x1.5t, Washer	12	870051	10x3.5x1.5t, Washer
13 -	870052	10x6x1.5t, Washer	13	870052	10x6x1.5, Washer
14	27267063	Guide for power switch knob	14	27267063	Guide for power switch knob
15	27267064	Guide for push switch knob	15	27267064	Guide for push switch knob
16	28320399	Push switch knob	16	28320399	Push switch knob
17	27180049	Spring for knob	17	27180049	Spring for knob
18	28320398	Power switch knob	18	28320398	Power switch knob
19	28320396	Volume control knob	19	28320396	Volume control knob
20	28320408	Tuning knob	20	28320408	Tuning knob
21	28320397	Tone control knob	21	28320397	Tone control knob
22	27170071	Bottom board	22	27170071	Bottom board
23	27175009	T-C, Leg	23	27175009	T-C, Leg
24	831130082	3STW+8BQ, Tapping screw	24	831130082	3STW+8BQ, Tapping screw
25	831130122	3STW+12BQ, Tapping screw	25	831130122	3STW+12BQ, Tapping screw
26	28140126	Cushion	26	28140126	Cushion
29	27185002A	DP-16N, Dial pulley	29	27185002A	DP-16N, Dial pulley
30	27185006	Dial pulley	30	27185006	Dial pulley
31	27130192	Bracket	31	27130192	Bracket
32	13549131	Pointer ass'y	32	13549131	Pointer ass'y
33	28133023	Back plate	33	28133023	Back plate
34	28130087	Dial plate	34	28130087	Dial plate
35	27190065	Holder for dial plate	35	27190065	Holder for dial plate
36	27250039A	Lamp case (L)	36	27250039A	Lamp case (L)
37	27250040A	Lamp case (R)	37	27250040A	Lamp case (R)
38	28198527	Facet	38	28198527	Facet
39	25045018	LJ-100-J, Stereo headphone jack	39	25045018	LJ-100-J, Stereo headphone jack
40	243117	NIND-0500S117 (Pointer: white),	40	243117	NIND-0500S117(Pointer: White),
		Signal strength and output level			Signal strength and output level
		meter		242120	meter
	243129	NIND-0500S129 (Pointer: Red)	4.1	243129	NIND-0500S129 (Pointer: Red)
41	243118	NIND-0250S118 (Pointer: White),	41	243118	NIND-0250S118 (Pointer: White),
	242120	Center meter		242120	Center meter
	243130	NIND-0250S130 (Pointer: Red),		243130	NIND-0250S130 (Pointer: Red),
4.2	27120102	Center meter	42	27120102	Center meter
42	27130193	Bracket for meter	43	27130193 25030150	Bracket for meter
43	25030150	NRS-144-40Y, Speaker selector switch	43	23030130	NRS-144-40Y, Speaker selector switch
44	25035047		44	25035176	
45	210078	NPS-111L12P, Power switch PL12V0.03AW-4, Locked, Tuned,	77	25035176	NPS-111-L140, Power switch (G) NPS-121-L, Power switch (W)
+ .J	210070	and Stereo indicator lamp	45	210078	PL12V0.03AW-4, Locked, Tuned,
47	15349599	NAPL-799, Dial illumination lamp	75	2100/0	and Stereo indicator lamp
T /	10047077	p.c.b.	47	15349599	NAPL-799, Dial illumination lamp
		P.S.S.	• •	10017077	p.c.b.
					Protot

(W): Only 12/220 V model (G): Only 220 V model (D): Only 120 V model

PRECAUTIONS

Fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

Speaker protection fuse: The speaker protection fuse is located on the back panel. Remove the screw holding the fuse cover and fuse case.

Rating: 4A-T (Parts No.: 252014)

AC fuse: Remove the top cover. The AC fuse is located on the power supply pc board.

Rating: F901 4A (ST-6) (Parts No.: 252049) (Only 120V model) F901 2A-SE-EAK (Parts No.: 252074) (Only 220V model)

F902, F903 5A-SE-EAK (Parts No.: 252078) (Only 220V model)

F901 4A-T (Parts No.: 252014) (Only 120/220V model)

F902 2.5A-T (Parts No.: 252025) (Only 120/220V model) (on the chassis)

ALIGNMENT PROCEDURES

INSTRUMENTS REQUIRED

- 1. DC Voltmeter
- 2. AM Sweep Generator
- 3. AM/FM Signal Generator
- 4. AC VTVM
- 5. Oscilloscope
- 6. Monitorscope
- 7. Distortion Analyzer
- 8. Stereo Modulator
- 9. Frequency Counter

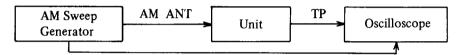
GENERAL ALIGNMENT CONDITIONS

- 1. Signal input should be kept as low as possible.
- 2. Standard modulation is 400Hz 30% (AM), 1kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO).
- 3. Standard knob position

SPEAKERS
BASS, TREBLE & BALANCE Center
HIGH FILTER OFF
MODE STEREO
DE-EMPHA NORMAL
LOUDNESS OFF
MUTING LOCK OFF
TAPE 1. 2 OFF (SOURCE)

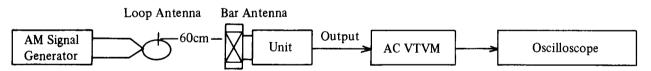
(1) AM IF ALIGNMENT

- 1. Set SELECTOR switch to AM.
- 2. Set radio dial to quiet point.



Set signal	Adjust	Oscilloscope	Remarks	
455kHz	X1 51	Maximum Symmetrical Response	Usually not necessary to adjust	

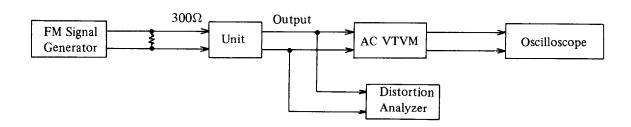
(2) AM RF ALIGNMENT



Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks	
1	515kHz 400Hz 30%	Lower end (515kHz)	L153	Maximum	Repeat steps 1 and	
2	1680kHz 400Hz 30%	Upper end (1680kHz)	TC152	Maximum	2 as necessary	
3	600kHz 400Hz 30%	600kHz	L151	Maximum	Repeat steps 3 and	
4	1400kHz 400Hz 30%	1400kHz	TC151	Maximum	4 as necessary	

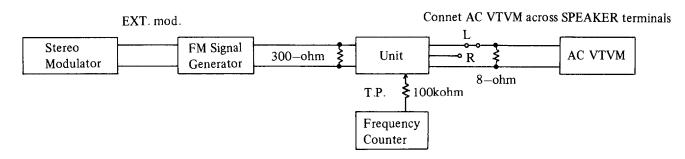
(3) FM FRONT END ALIGNMENT

- 1. Set SELECTOR switch to FM.
- 2. Connect FM Signal Generator to 300-ohm antenna terminals.

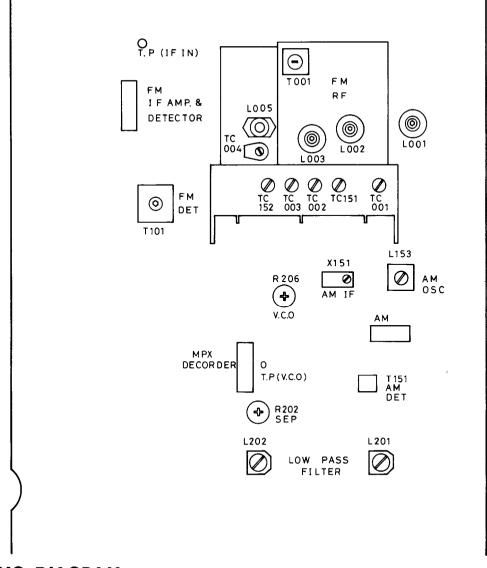


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks	
1	No signal	Quiet Point	T101 Bottom	Tuning Indicator	Center	Repeat Steps 1 and 2 as necessary	
2	98MHz 65dBf 1kHz 75kHz div.	98MHz	T101 Top	Distortion Analyzer	Minimum		
3	90MHz 65dBf 1kHz 75kHz div.	90MHz	L005	Tuning	Center	Repeat Steps 3	
4	106MHz 65dBf 1kHz 75kHz div.	106MHz	TC004	Indicator	Center	and 4 as necessary	
5	90MHz 20dBf 1kHz 75kHz div.	90MHz	L001~L003	AC VTVM or	Maximum	Repeat Steps 5	
6	106MHz 20dBf 1kHz 75kHz div.	106MHz	TC001~TC003	Oscilloscope	Maximum	and 6 as necessary	
7	98MHz 65dBf 1kHz 75kHz div.	98MHz	T001	Distortion Analyzer	Minimum		

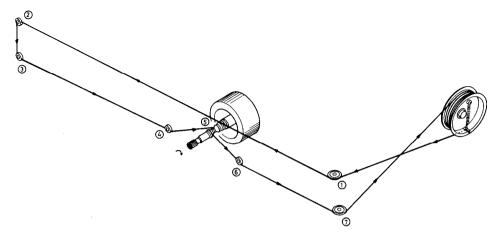
(4) MULTIPLEX ALIGNMENT



Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks		
1	98MHz no mod. 65dBf	_	98MHz	R206	Frequency Counter	19,000±19Hz			
2	STEREO INDICATOR should light up when stereo program is being received.								
3	98MHz EXT. Mod. 65dBf	Pilot Sig. 9% Main & Sub Sig. 1KHz Lch 91%	98MHz	R202	AC VTVM Right ch.	Minimum	Repeat Steps		
4	Same as above	Pilot Sig. 9% Main & Sub Sig. 1KHz Rch 91%	98MHz	R202	AC VTVM Left ch.	3 & 4 a necessa			



STRINGING DIAGRAM

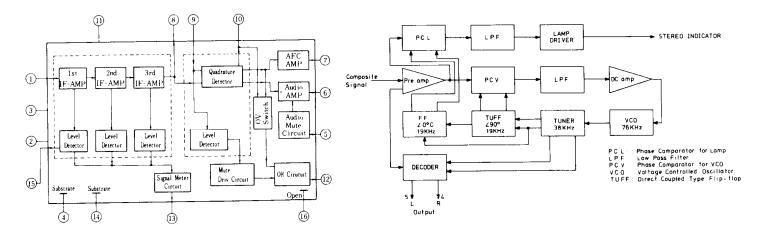


- 1. Close the variable capacitor complete and tie the dial cord to the spring of the drum.
- 2. Thread the dial cord in the direction of arrow from ① to ④ and wind the dial cord three turns around the tuning shaft clockwise.
- 3. Thread the dial cord 6 and 7.
- 4. Wind the dial cord 1½ turns around the dial drum.

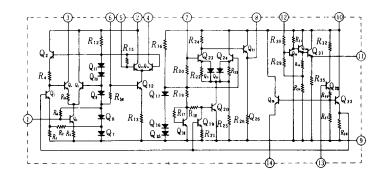
IC BLOCK DIAGRAM

HA-1137 BLOCK DIAGRAM

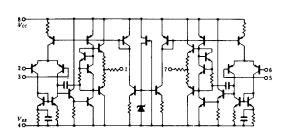
LA3350 BLOCK DIAGRAM



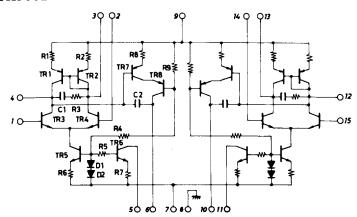
HA-1151 EQUIVALENT CIRCUIT



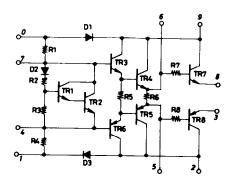
NJM4558D, 4559DX



STK3062



STK-0050II



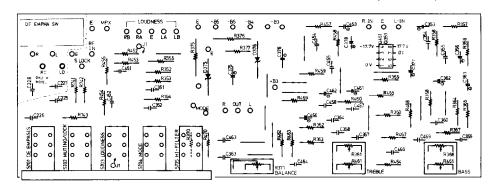
PRINTED CIRCUIT BOARD-PARTS LIST (D/W model)

FM/AM TUNER AND EQUALIZER AMPLIFIER PC BOARD (NARFE-781a) — PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION			
	ICs				
Q102 Q151 Q201 Q301, Q401 Q701	222421 222418 222449 222534 222465 Transistors	HA1137W HA1151 LA3350 NJM4559DX NJM4558D	C304, C404 C309, C409 C311, C312 C702 C703 C706 C707	352721019T 392880227T 352780339T 352780109T 352742209T 352744799T 352741009T	100μF, 6.3V, Elect. 2.2μF, 50V, LL 3.3μF, 50V, Elect. 1μF, 50V, Elect. 22μF, 16V, Elect. 0.47μF, 50V, Elect. 10μF, 16V, Elect.
Q001 Q002 Q003 Q101	2211815 2211845 2211342 2211722, 2211723 or 2210823	2SK19TM-GR, F.E.T 2SC785TM-O(ONK) 2SC461(B) 2SC1923(O), 2SC1923(R) or 2SC1675(L-1)	C708 C709 C710 C711 C713 C714	352784799T 352732209T 352744709T 352721019T 352742219 352741009T	0.47μ F, 50V, Elect. 22μ F, 10V, Elect. 47μ F, 16V, Elect. 100μ F, 6.3V, Elect. 220μ F, 16V, Elect. 10μ F, 16V, Elect.
Q202 Q203 Q702~Q704 Q706~Q708 Q705	2211256 2211256, 2211255 or 2210746 2211256 Diodes	2SC1815(BL) 2SC1815(BL), 2SC1815(GR) or 2SC945(A)P 2SC1815(BL)	R202 R206 R356, R456	Resistors 5225024 5225019 5148042	N10HR1KBD, Semi-fixed N10HR4.7KBD, Semi-fixed N16RGL100KBTP40, Volume control variable
D001	223110	1S2687	0004 0004	Switch	NIDG 242 222 T 150 G L 4 - /
D101, D102 D151, D153	223105 223105	1S1555 1S1555	S801~S804	25035186	NPS-242-222-L150, Selector/ Tape monitor
D152 D202	4000022 223105	VD1212 1S1555	P801	Terminals 25045020	NPJ-4PDBL11, Phono/
D701, D702 D704~D708 D703	224011 or	YZ047 or	P802	25045041	Tape rec. 2 NPJ-6PDBL18, Tape 1/
2,03	223943	RD4.7EB		Chialded	Tape pb. 2
	Coils	NT 4 2000		Shielded case 27225029	
L001 L002 L003 L004	233106 or 233088-1 233112 233113 233152	NFA-3009 or FFA-3001 NFRF-3008 NFRF-3009 NFT-1503		Shielded plate 27150085	
L005 L101, L102	233090 233105	NFO-3003 NCH-1005		MPLIFIER P 	
L103 L151	233114 233152	NCH-1009 NFT-1503	CIRCUIT NO.	PARTS NO.	DESCRIPTION
L153	232065	NMO-2002		IC.	
L201, L202	233021 or	NMC-8-5 or	0501 0601	ICs	STRAGGA
L201, L202	233107	NMC-8-5 or NMC-5002	Q501, Q601 Q502, Q602	222023 222502	STK3062 NJM4558DX
T001				222023 222502 222022	
·	233107 Transformers	NMC-5002	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904,	222023 222502 222022 Transistors 2211544 2211255,	NJM4558DX
T001 T101	233107 Transformers 233085 233101 or 233083	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906	222023 222502 222022 Transistors 2211544 2211255, 2211256 or	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or
T001 T101	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904,	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR),
T001 T101 T151 X101, X102 X151	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004 Capacitors	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)
T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021 C106 C108	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004 Capacitors 3050006 3060003 352741019T 352750479T 352741009T	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100µF, 16V, Elect. 4.7µF, 25V, Elect. 10µF, 16V, Elect.	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P) 1S1555 1N60 or 1K60 1S1588
T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021 C106 C108 C109 C118	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004 Capacitors 3050006 3060003 352741019T 352750479T 352741009T 352741009T 352782209T 352750339T	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100µF, 16V, Elect. 4.7µF, 25V, Elect. 10µF, 16V, Elect. 22µF, 50V, Elect. 3.3µF, 25V, Elect.	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P) 1S1555 1N60 or 1K60
T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021 C106 C108 C109 C118 C153 C158	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004 Capacitors 3050006 3060003 352741019T 352750479T 352750479T 352750339T 372523614 352741009T	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, Elect. 3.60pF±5%, 50V, ST 10μF, 16V, Elect.	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223103 or 223132 233119 223804	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P) 1S1555 1N60 or 1K60 1S1588 GP-08B or SR1K-2
T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021 C106 C108 C109 C118 C153	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004 Capacitors 3050006 3060003 352741019T 352750479T 352741009T 352750339T 372523614	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, Elect. 3.3μF, 25V, Elect. 20μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 50V, Elect. 1μF, 50V, Elect. 1μF, 50V, Elect. 1μF, 50V, Elect. 1μF, 50V, Elect. 100μF, 6.3V, Elect.	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511,	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119 223848 or 223804 233105	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P) 1S1555 1N60 or 1K60 1S1588 GP-08B or SR1K-2
T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021 C106 C108 C109 C118 C153 C158 C159 C162 C163 C165 C201 C202	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004 Capacitors 3050006 3060003 352741019T 3527409T 352782209T 352750339T 372523614 352741009T 35278219 352780109T 352780109T 352780109T 352780109T	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, Elect. 3.60pF±5%, 50V, ST 10μF, 16V, Elect. 220μF, 16V, Elect. 220μF, 16V, Elect. 10μF, 50V, Elect. 14F, 50V, Elect. 10μF, 50V, Elect. 10μF, 16V, Elect. 10μF, 50V, Elect.	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511, C610, C611 C513, C514	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119 223804 233105 Capacitors 352780339T 352780109T	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P) 1S1555 1N60 or 1K60 1S1588 GP-08B or SR1K-2 1S1555 3.3µF, 50V, Elect. 1µF, 50V, Elect.
T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021 C106 C108 C109 C118 C153 C158 C159 C162 C163 C165 C201 C202 C203 C204 C205 C206	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004 Capacitors 3050006 3060003 352741019T 352750479T 352750479T 35275039T 372523614 352741009T 352780109T 392883397T 392883297T 392883297T	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, Elect. 3.60F±5%, 50V, ST 10μF, 16V, Elect. 220μF, 16V, Elect. 1μF, 50V, Elect. 1.0μF, 50V, Elect. 1.0μF, 50V, Elect. 1.0μF, 16V, Elect.	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511, C610, C611 C513, C514 C613, C614 C751, C752 C753, C754	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210803 Diodes 223105 223103 or 223132 2233119 223848 or 223804 233105 Capacitors 352780339T 352780479T 352780339T 35278039T 35278039T 35278039T 35278039T 35278039T 35278039T	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P) 1S1555 1N60 or 1K60 1S1588 GP-08B or SR1K-2 1S1555 3.3μF, 50V, Elect. 4.7μF, 50V, Elect. 4.7μF, 50V, Elect. 22μF, 25V, LL 3.3μF, 50V, Elect. 1.2μF, 50V, Elect. 1.2μF, 50V, Elect.
T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021 C106 C108 C109 C118 C153 C158 C159 C162 C162 C163 C165 C201 C202 C203 C204 C205	233107 Transformers 233085 233101 or 233083 232041 Ceramic filters 3010003 3010004 Capacitors 3050006 3060003 352741019T 352750479T 352750479T 35275039T 35275039T 35275039T 352780109T 352780109T 352780109T 352741009T 35274109T 352780109T 35274109T 35274109T 35274109T 35274179 35278019T 35274179 35274719	NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100µF, 16V, Elect. 4.7µF, 25V, Elect. 10µF, 16V, Elect. 22µF, 50V, Elect. 3.3µF, 25V, Elect. 3.3µF, 50V, Elect. 220µF, 16V, Elect. 220µF, 16V, Elect. 1.33µF, 50V, Elect. 1.00µF, 6.3V, Elect. 1.00µF, 6.3V, Elect. 1.00µF, 16V, Elect.	Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511, C610, C611 C513, C514 C613, C614 C516, C616 C751, C752	222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210803 Diodes 223105 223103 or 223132 233119 223848 or 223804 233105 Capacitors 352780339T 352780479T 352780339T 352780339T 352780339T 352780339T 352780339T 352780339T	NJM4558DX STK-0050II 2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P) 1S1555 1N60 or 1K60 1S1588 GP-08B or SR1K-2 1S1555 3.3μF, 50V, Elect. 1μF, 50V, Elect. 4.7μF, 50V, Elect. 22μF, 25V, LL 3.3μF, 50V, Elect. 2.2μF, 50V, Elect.

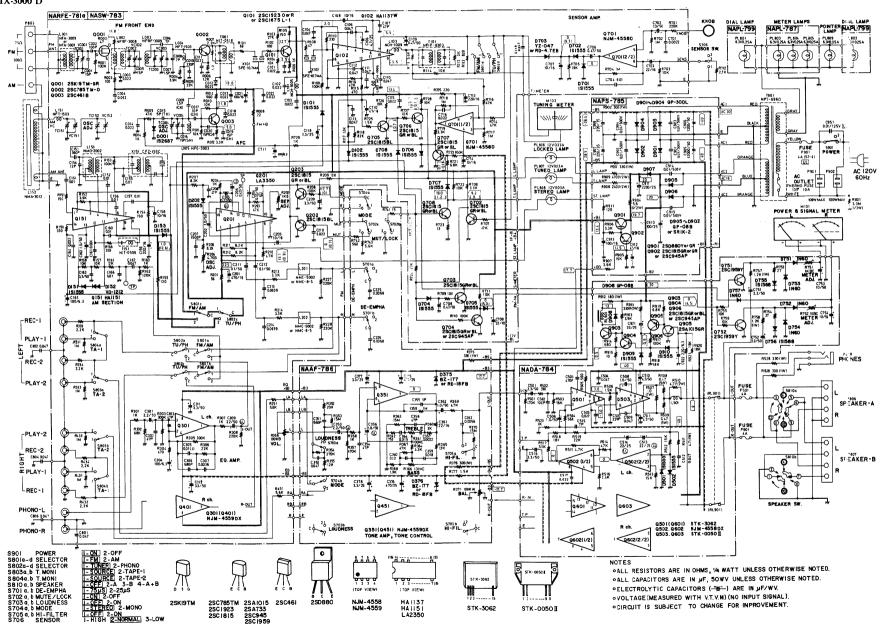
R507, R607	Resistors 451730104	1Ω, 2W, Metal	C362, C462 C375, C376	352780109T 352754719T	1μF, 50V, Elect. 470μF, 25V, Elect.
R508, R509,		0.47Ω , 5W, Metal plate	C377, C378	352750339T	3.3μ F, 25V, Elect.
R608, R609 R751, R752	5225018	N10HR1KBC, Semi-fixed	R361, R461	Resistors	N16RGM11C100KCO40,
R757, R758 R912	441621224 441621814	1.2kΩ, 1W, Metal oxide film 180Ω, 1W, Metal oxide film	R366, R466	5148038 5148039	Treble control variable
	Coil		,		N16RGM11C100KCS40, Bass control variable
L501, L502	231001	S-1.3B	R371, R471	5146017	N16RLC100KWTP40, Balance control variable
	Relay		R375	441623314	330Ω, 1W, Metal oxide film
RL901	25065085A	NRL-2P5A-DC12-03		Switches	
POWER S	SUPPLY PC	BOARD		25035174	NPS-522-L138, High filter/
	(5) – PARTS				Mode/Loudness/FM muting/ De-emphasis
CIRCUIT NO). PARTS NO.	DESCRIPTION	TONE AM	DITETED DO	DO A DD
	Transistors			PLIFIER PC (b) – PARTS	
Q901	2201075 or	2SD880(Y) or	(W model)	ou) – PAKIS	LIST
Q902	2201074 2211256,	2SD880(GR) 2SC1815(GR),	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	2211255 or 2210746	2SC1815(BL) or 2SC945(A)P		IC	
	Diodes	23C943(A)F	Q351, Q451	222534	NJM-4559DX
D901~D904	223863	GP-30DL		Diode	
D905~D907	223848 or	GP-08B or	D375, D376	224072	BZ-177
	223804	SR1K-2	G252 G452	Capacitors	2.2 E #01/ 1 /
C005 C006	Capacitors	12.000 F 50V El4	C353, C453 C356, C456	392880227T 392880107T	2.2μF, 50V, LL 1μF, 50V, LL
C905, C906 C907, C908	3504125 352762219	$12,000\mu F$, 50V, Elect. $220\mu F$, 35V, Elect.	C361, C461 C362, C462	352742209T 352780109T	22μF, 16V, Elect.
C910 [°] C911	352751019 352752229	100μF, 25V, Elect. 2,200μF, 25V, Elect.	C375, C376	352754719T	1μF, 50V, Elect. 470μF, 25V, Elect.
C912	352744709P	47μF, 16V, Elect.	C377, C378	352750339T	3.3μ F, 25V, Elect.
C913	352741019P	100μF, 16V, Elect.	D261 D461	Resistors	N1 (D () 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
R901	Resistors	2200 118 Mar Land Cit	R361, R461	5148038	N16RGM11C100KCO40, Treble control variable
R902	441623314 441623014	330Ω, 1W, Metal oxide film 300Ω, 1W, Metal oxide film	R366, R466	5148039	N16RGM11C100KCS40, Bass control variable
R904	451530564	5.6Ω , $1/2W$, Metal	R371, R471	5146017	N16RLC100KWTP40,
	Radiator		R375	441623314	Balance control variable 330Ω, 1W, Metal oxide film
	27160011A	Radiator	-	Switches	
	Fuseholder 250113	SN5051		25035174	NPS-522-L138, High filter/
	Fuses	3143031			Mode/Loudness/FM muting/ De-emphasis
F901	252049	4A (ST-6)		250142	NSS-2225, De-emphasis
		. ,	METED II	LUMINATIO	N LAMP PC BOARD
	MPLIFIER PO) – PARTS I	
(NAAF-/8 (D model)	36) – PARTS	LIST	CIRCUT NO.	PARTS NO.	DESCRIPTION
CIRCUIT NO		DESCRIPTION	PL803~PL805		PL6.3V, 0.25A, Pilot lamp
	IC		DIAL PLA	TE ILLUMIN	NATION PC BOARD
Q351, Q451	222534	NJM-4559DX) – PARTS I	
	Diode		CIRCUIT NO.		DESCRIPTION
D375, D376	224072 or 224000	BZ-177 or RD-18FB	NOTES	210054A	PL6.3V, 0.25A, Pilot lamp
	Capacitors		NOTES: 1. DC voltage as	e measured with	V.T.V.M. to chassis at no signal
C353, C453	392880227T	$2.2\mu F$, 50V, LL	applied.		current type electrolytic
C356, C456 C361, C461	392880107T 352742209T	$1\mu F$, 50V, LL $22\mu F$, 16V, Elect.	2. Capacitor	capacitor	
•				ST: Polystyren f	
C AMPLII	-IEK PU BU	DARD VIEW FROM E	SULLUM SI	レロ (リ mode	:1)

TONE AMPLIFIER PC BOARD VIEW FRO



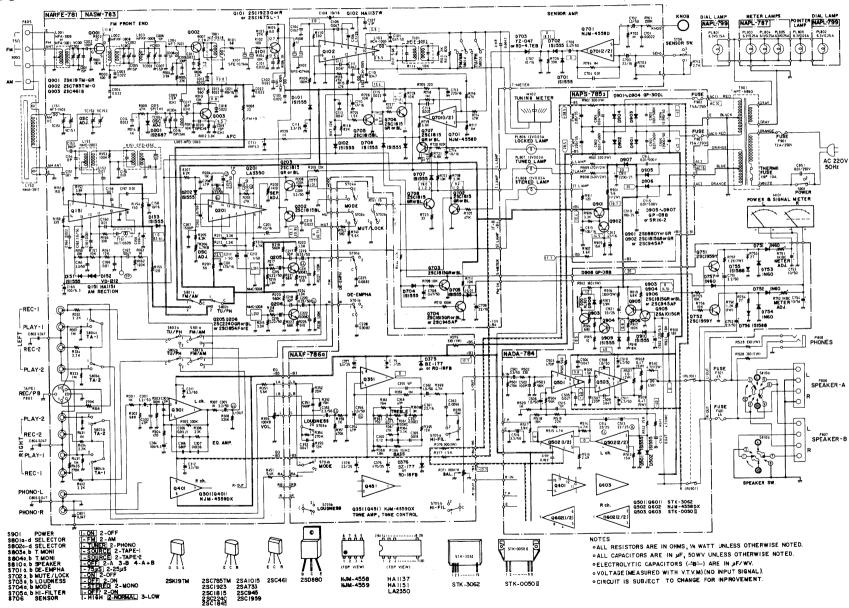
SCHEMATIC DIAGRAM

MODEL TX-3000 D

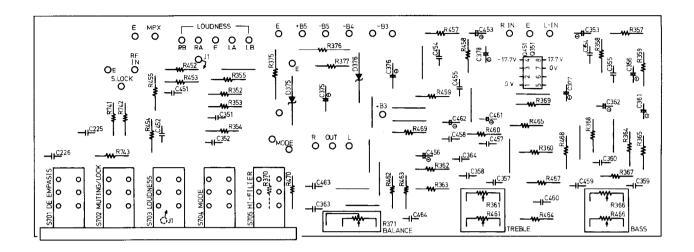


SCHEMATIC DIAGRAM

MODEL TX-3000 G



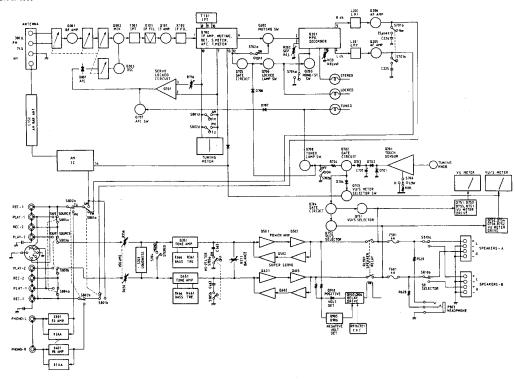
TONE AMPLIFIER PC BOARD VIEW FROM BOTTOM SIDE (G/W model)



PRINTED CIRCUIT BOARD-PARTS LIST

	R PC BOAR	EQUALIZER D (NARFE-781) —	T001 T101	Transformers 233085 233101 or	NIT-0518 NFIF-6003 or
CIRCUIT NO.	PARTS NO.	DESCRIPTION	T151	233083 232041	NIT-3516 NIT-0509
cinceri itei	ICs			Ceramic filters	
Q102 Q151 Q201	222421 222418 222449	HA1137W HA1151 LA3350	X102, X102 X151	3010003 3010004 Capacitors	SFE-10.7MA CFZ-455C
Q301, Q401 Q701	222534 222465	NJM4559DX NJM4558D	VC001~VC004	3050006	NVC-20FQ327WD02, Variable NTC-10P02, Trimmer
	Transistors		TC004 C021	3060003 352741019T	$100\mu\text{F}$, 16V, Elect.
Q001 Q002 Q003 Q101	2211815 2211845 2211342 2211722, 2211723 or 2210823 2211256	2SK19TM-GR 2SC785TM-O(ONK) 2SC461(B) 2SC1923(O), 2SC1923(R) or 2SC1675(L-1) 2SC1815(BL)	C106 C108 C109 C118 C153 C158 C159	352750479T 352741009T 352782209T 352750339T 372523614 352741009T 352742219	4.7 μ F, 25V, Elect. 10 μ F, 16V, Elect. 22 μ F, 50V, Elect. 3.3 μ F, 25V, Elect. 360 p F±5%, 50V, ST 10 μ F, 16V, Elect. 220 μ F, 16V, Elect.
Q203 Q702~Q704 Q706~Q708 Q205, Q206	2211256, 2211255 or 2210746 2211405, 2211406, 2211732 or 2211733	2SC1815(BL), 2SC1815(GR) or 2SC945(A)P 2SC2240(GR), 2SC2240(BL), 2SC1845(E) or 2SC1845(F)	C162 C163 C165 C201 C202 C203 C204	352780109T 352780339T 352721019T 352744719 352780109T 352741009T 392883397T	1μF, 50V, Elect. 3.3μF, 50V, Elect. 100μF, 6.3V, Elect. 470μF, 16V, Elect. 1μF, 50V, Elect. 10μF, 16V, Elect. 0.33μF, 50V, LL
Q705	2211256	2SC1815(BL)	C205 C206	392882297T 392884797T	0.22μF, 50V, LL 0.47μF, 50V, LL
D001 D101, D102 D151, D153 D152	Diodes 223110 223105 223105 4000022	1S2687 1S1555 1S1555 VD1212	C207 C209 C211, C212 C215, C216 C219, C220 C301, C401	372521524 352780339T 352780109T 392883397T 352780229T	1,500pF±5%, 50V, ST 3.3μF, 50V, Elect. 1μF, 50V, Elect. 0.33μF, 50V, LL 2.2μF, 50V, Elect.
D202 D701, D702 D704~D708 D703	223105 224011 or 223943 Coils	1S1555 YZ047 or RD4.7EB	C304, C404 C309, C409 C311, C312 C702 C703	352721019T 392880227T 352780339T 352780109T 352742209T	100μF, 6.3 V, Elect. 2.2μF, 50V, LL 3.3μF, 50V, Elect. 1μF, 50V, Elect. 22μF, 16V, Elect.
L001 L002 L003 L004 L005 L101, L102	233106 or 233088-1 233112 233113 233152 233090 233105	NFA-3009 or FFA-3001 NFRF-3008 NFRF-3009 NFT-1503 NFO-3003 NCH-1005	C706 C707 C708 C709 C710 C711 C713 C714	352784799T 352741009T 352784799T 352732209T 352744709T 352721019T 352742219 352741009T	$0.47\mu\text{F}$, 50V, Elect. $10\mu\text{F}$, 16V, Elect. $0.47\mu\text{F}$, 50V, Elect. $22\mu\text{F}$, 10V, Elect. $47\mu\text{F}$, 16V, Elect. $100\mu\text{F}$, 6.3V, Elect. $220\mu\text{F}$, 16V, Elect. $10\mu\text{F}$, 16V, Elect.
L103 L151	233114 233152	NCH-1009 NFT-1503		Resistors	
L153 L201, L202	232065 233126	NMO-2002 NMC-5008	R202 R206 R356, R456	5225024 5225019 5148042	N10HR1KBD, Semi-fixed N10HR4.7KBD, Semi-fixed N16RGL100KBTP40, Volume control variable

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

1. Touch sensor

The purpose of this circuit is to operate both the power/signal strength meter and servo locked circuit switching transistors.

1.1 Servo locked circuit switching circuit

In order to ensure accurate tuning, the servo locked circuit is turned off automatically once the tuning knob is touched, and also when the muting circuit is switched off.

When a station is turned, Q702 will turn off and Q708 turn on (since Q705 will already be off and Q706 on), resulting in the TUNED lamp turning on. And since Q707 will turn off when Q708 turns on, the servo locked circuit will also begin to operate.

When the tuning knob is touched, a certain amount of hum is induced.

This hum is amplified by Q701, rectified by D701 and D702 into a DC signal, and applied to Q702 is consequently turned on, resulting in the servo locked circuit being switched off. If, however, the hum level is rather low, the tuned lamp might not turn on even when the tuning knob is touched. If this happens, reset the back panel sensor switch to either the Normal or High position.

1.2 Power/signal strength meter

When the tuning knob is not being operated, this meter displays the level of power applied to be right speaker system. The instant the tuning knob is touched, the meter changes to display the signal strength of the radio broadcast.

When the tuning knob is touched, Q702 turns on. And since Q703 and Q704 turn off and Q751 and Q752 turn on, and power/signal strength meter is changed to signal strength meter from power meter.

2. Protection circuit

The protection circuit is operated:

(1) When the B circuit is unstable when the power is turned ON (approximately 5 seconds)

(2) When the center voltage has increased because of trouble at the differential amplifier, etc. When the voltage detector is operated by abnormal voltage Q904 is turned ON by the voltage drop across R918. Q904, Q903 constitute a digitalized, fast response Schmitt trigger circuit. When Q904 is turned ON, Q903 is turned OFF. Q903 is a relay drive transistor. When it is turned OFF, the relay is also turned OFF.

When the power switch is turned ON, charging current flows thru the loop $R916 \rightarrow C921 \rightarrow R917 \rightarrow R918$ and Q904 is turned ON by the voltage drop across R918. Consequently, Q903 and the relay are turned OFF until the charging current drops below a certain value. When the power switch is turned OFF, the B voltage falls and C921 is quickly discharged thru the loop $R916 \rightarrow C921 \rightarrow D909$. During normal operation, C921 is charged to almost the B voltage. But since the saturation resistance of Q904 is sufficiently low, when Q904 is turned ON, C921 is quickly discharged thru the loop $C921 \rightarrow R917 \rightarrow Q904$ and the relay is also turned OFF. The relay is not turned ON again thereafter until C921 is charged, even if the set should return to normal and Q903 is turned OFF.

3. Muting Circuit

The Quadrature detector IC incorporates an IF level detector circuit (output at pin 12). If the IF signal level drops below the muting level, pin 12 will be switched to high level, turning Q202 on. Consequently, the detector output signal will be cut off before it can be applied to the multiplex IC. When, on the other hand, the IF signal level is higher than the muting level, the Q102 pin 12 will be switched to low level, turning Q202, and Q705 off. Q706 will therefore turn on, followed by the LOCKED lamp turning on.

4. Servo Locked Circuit

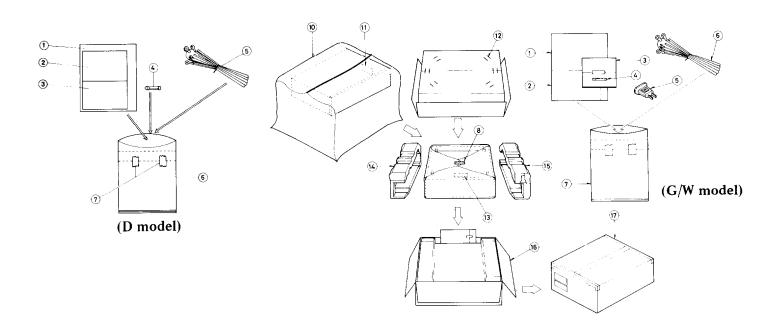
The DC potential difference across both ends of the tuning meter (corresponding to the DC portion of the ratio detector output) is amplified by the O701 operational amplifier in order to increase the AFC control capacity.

	Switch			Capacitors	
S801~S804	25035186	NPS-242-222-L150, Selector/ Tape monitor	C905, C906 C907, C908	3504125 352762219	12,000μF, 50V, Elect. 220μF, 35V, Elect.
	Terminals	Tupe monitor	C910	352751019	100μF, 25V, Elect.
P801	25045020	NPJ-4PDBL11, Phono/	C911	352752229 352744709P	$2,200\mu\text{F}, 25\text{V}, \text{Elect}.$ 47 $\mu\text{F}, 16\text{V}, \text{Elect}.$
F001	23043020	Tape rec. 2	C912 C913	352741019P	100μF, 16V, Elect.
P802	25045041	NPJ-6PDBL18, Tape 1/ Tape pb. 2		Resistors	
P803	250199	S-13316, Din	R901, R902	441623014	300Ω, 1W, Metal oxide film
	Shielded case		R904	451530564	5.6Ω , $1/2W$, Metal
	27225029			Radiator	
	Shielded plate			27160011A	Radiator
	27150085			Fuseholder	
DOWED 41	ANTIELED D	C DOADD		25050052	SN5053
	MPLIFIER P			Fuses	
•	PARTS	DESCRIPTION	F901	252074	2A-SE-EAK
CIRCUIT NO.	PARTS NO.	DESCRIPTION	F902, F903	252078	5A-SE-EAK
0501 0(01	ICs	CTV 2062		Fuse label	
Q501, Q601 Q502, Q602	222023 222502	STK3062 NJM4558DX		29360364	T2A/250V
Q503, Q603	222022	STK-0050II	TONE AMI	PLIFIER PC	BOARD (NAAF-786a)
	Transistors		– PARTS I		
Q751, Q752	2211544	2SC1959(Y)	CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q903, Q904 Q906	2211255, 2211256 or	2SC1815(GR), 2SC1815(BL) or		IC	
_	2210746	2SC945(A)P	Q351, Q451	222534	NJM-4559DX
Q905	2211455 or 2210803	2SA1015(GR) or 2SA733(P)		Diode	
	Diodes		D375, D376	224072 or	BZ-177 or
D501, D502	223105	1S1555	,	224000	RD-18FB
D601, D602				Capacitors	
D751~D754 D757	223103 or 223132	1 N60 or 1 K60	C353, C453	392880227T	2.2μF, 50V, LL
D755, D756	223119	1S1588	C356, C456 C361, C461	392880107T 352742209T	1μF, 50V, LL 22μF, 16V, Elect.
D908	223848 or 223804	GP-08B or SR1K-2	C362, C462	352780109T	1μF, 50V, Elect.
D09, D910	223105	181555	C375, C376 C377, C378	352754719T 352750339T	470μF, 25V, Elect. 3.3μF, 25V, Elect.
	Capacitors		,	Resistors	
C501, C602	352780339T	$3.3\mu\text{F}$, 50V, Elect.	R361, R461	5148038	N16RGM11C100KC040,
C506, C606 C510, C511,	352780109T 352780479T	1μ F, 50V, Elect. 4.7 μ F, 50V, Elect.	,	£149020	Treble control variable
C610, C611		• • •	R366, R466	5148039	N16RGM11C100KCS40, Bass control variable
C513, C514, C613, C614	392852207T	22μF, 25V, LL	R371, R471	5146017	N16RLC100KWTP40, Balance control variable
C516, C616	352780339T 352780229T	3.3μF, 50V, Elect. 2.2μF, 50V, Elect.	R375,	441623314	330Ω, 1W, Metal oxide film
C751, C752 C753, C754	352781009T	10μF, 50V, Elect.		Switches	
C921 C922	352753309T 352722219	33μF, 25V, Elect. 220μF, 6.3V, Elect.		25035174	NPS-522-L138, High filter/
C922	Resistors	220µ1, 0.3 1, Dioci.			Mode/Loudness/FM muting/ De-emphasis
R507, R607	451730104	1Ω, 2W, Metal			•
R508, R509,	4000047	0.47Ω, 5W, Metal plate			ON LAMP PC BOARD
R608, R609 R751, R752	5225018	N10HR1KBC, Semi-fixed	`) — PARTS	
R757, R758	441621224	1.2kΩ, 1W, Metal oxide film	CIRCUIT NO.		DESCRIPTION PLG 3V 0.25A Pilot lamp
R912	441621814	180Ω, 1W, Metal oxide film	PL803~PL805	210054B	PL6.3V, 0.25A, Pilot lamp
	Coil	G	DIAL PLA	TE ILLUMI	NATION PC BOARD
L501, L502	231001	S-1.3B) – PARTS	
	Relay	NDI 2864 DC12 02	CIRCUIT NO.	PARTS NO.	DESCRIPTION
RL901	25065085A	NRL-2P5A-DC12-03		210054A	PL6.3V, 0.25A, Pilot lamp
POWER SUPER		BOARD (NAPS-785a) –		are measured with	V.T.V.M. to chassis at no signal
CIRCUIT NO.		DESCRIPTION	applied. 2. Capacitor	LL: Low leakas	ge current type electrolytic
	Transistors		2. Supusitor	capacitor	- · ·
Q901	2201075 or	2SD880(Y) or		ST: Polyetyren	i tum capacitor
•	2201074	2SD880(GR)			
Q902	2211256, 2211255 or	2SC1815(GR), 2SC1815(BL) or			
	2210746	2SC945(A)P			
	Diodes				
D001 D004	222062	CD 20DI			

223863 223848 or 223804

D901~D904 D905~D907 GP-30DL GP-08B or SR1K-2

PACKING PROCEDURES



PACKING PROCEDURES - PARTS LIST

(D model)	•		(W/G mode	1)	
REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1	29340391	Instruction manual	1	29340394	Instruction manual
2	29358002	Service station list (N)	2	29365005-2	Warranty card (V)
3	29365006	Warranty card (N)	3	29100002	Poly bag (W)
4	252014	4A-T, Fuse	4	252014	4A-T, Fuse
5	292064	FM antenna	5	25055018	CV-K-1, Conversion plug (W)
6	29100006	Poly bag	6	292064	FM antenna
7	261504	Tape	7	29100006	Poly bag
8	261504	Tape	8	261504	Tape
10	29100034	850x650mm, Poly bag	10	29100034	850x650mm, Poly bag
11	29360362	Label (N)	12	282301	Sealing hook
12	282301	Sealing hook	14	29090477	Pad (R)
13	29360363	Caution label (N)	15	29090478	Pad (L)
14	29090477	Pad (R)	16	29050332	Carton box
15	29090478	Pad (L)	17	260012	Tape
16	29050332	Carbon box		29355045	Sensor tag
17	260012	Tape			
	29355045	Sensor tag	(V): Only (Germany model	
(N): Only	U.S.A. model		(W): Only V	W model	

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